DOCUMENT RESUME

ED 149 403 CS 501 964

AUTHOR Moore, Carl M.; Coke, James G.
TITLE Delphi: An Overview, An Application, Some Lessons.
PUB DATE Dec 77
NOTE 32p.; Paper presented at the Annual Meeting of the Speech Communication Association (63rd, Washington, D.C., December 1-4, 1977); See related document CS501958

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS City Planning; Convergent Thinking; *Cooperative Planning; *Decision Making Skills; *Evaluation Methods; Information Seeking; *Intercommunication; *Needs Assessment; *Problem Solving; Productive Thinking; Questionnaires; Teamwork
IDENTIFIERS *Delphi Technique

ABSTRACT

This paper discusses Delphi-a method of utilizing individuals' knowledge, judgment, and opinions to address complex questions and applies the method to a community planning project in Stow, Ohio. There are four phases of any Delphi: (1) exploring the subject under discussion, with each individual contributing pertinent information, (2) reaching an understanding of how the group views the issue and defines terms, (3) identifying reasons for any disagreement and trying to evaluate them, and (4) participating in a final evaluation after analyzing and considering each of the previous phases. The paper includes a developmental report of the Stow project, the questionnaires and correspondence involved in the project, and recommendations for improving the implementation of the Delphi method. (MAI)

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DELPHI: AN OVERVIEW, AN APPLICATION, SOME LESSONS

Carl M. Moore
James G. Coke

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Paper presented at the Annual Meeting of the Speech Communication Association, Washington, D.C., December 1-4, 1977

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Carl M. Moore
James G. Coke
KENT STATE UNIVERSITY

I. DELPHI: AN OVERVIEW *

Evolution of Delphi

"Project Delphi" was the name given to an Air Force-sponsored Rand Corpcration study, starting in the early 1950's concerning the use of expert opinion. The objective of the original study was to "obtain the most reliable consensus of opinion of a group of experts ... by a series of intensive questionnaires interspersed with controlled opinion feedback."

The subject of this first study was the application of "expert opinion to the selection, from the point of view of a Soviet strategic planner, of the number of A-bombs required to reduce the munitions output by a prescribed amount."

Definition/Application

Delphi is a method of utilizing individual input (knowledge, judgment, opinion) to address complex questions. The Delphi technique is useful to:

Identify goals and objectives

Array possible alternatives

Make future projections/forecasts

Establish priorities

Reveal group values

Gather information

Educate a respondent group

Some specific applications of Delphi include:

Gathering current and historical data not accurately known or available .

Examining the significance of historical events.

Evaluating possible budget allocations.

Exploring urban and regional planning options.

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* Many of the ideas and the verbatim quotations in this brief outline are taken from Harold A. Linstone and Murray Turoff (eds.), The Delphi Method: Techniques and Applications (Reading, Mass. Addison-Wesley, 1975).

Planning university campus and curriculum development.

Putting together the structure of a model.

Delineating the pros and cons associated with potential policy options.

Developing casual relationships in complex economic or social phenomena.

Distinguishing and clarifying real and perceived human motivations.

Exposing priorities of personal values, social goals

Four phases of any Delphi

1. Explore the subject under discussion; each individual contributes additional information he feels is pertinent to the issue.

2. Reach an understanding of how the group views the issue (i.e., where the members agree or disagree and what they mean by relative terms such as importance, desirability, or feasibility).

3. If there is significant disagreement bring out the underlying reasons for the differences and if possible, evaluate them.

4. A final evaluation occurs when all previcusly gathered information has been initially analyzed and the evaluations have been fed back for ccnsideration.

When to Use Delphi

Key question:

Who is it that should communicate about the problem, what alternative mechanisms are available for that communication, and what can we expect to obtain with the alteraatives?

Delphi should be used when:

The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.

The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse background with respect to experience or expertise.

More individuals are needed than can effectively interact in a face-to-face exchange.

Time and cost make frequent group meetings infeasible.

The efficiency of face-to-face meetings can be increased by a supplemental group communication process.

Disagreements among individuals are so severe or politically unpalatable that the communication process must be refereed and/or anonymity assured.

The heterogeneity of the participants must be preserved to assure validity of the results, i.e., avoidance of domination by quantity or by strength of personality ("bandwagon effect").

Common Reasons for Delphi Failure

Imposing monitor views and perceptions of a problem upon the respondent group by overspecifying the structure of the Delphi and not allowing for the contribution of other presepctives related to the problem.

Assuming that Delphi can be a surrogate for all other human communications in a given situation.

Poor techniques of summarizing and presenting the group response and ensuring common interpretations of the evaluation scales in the exercise.

Ignoring and not exploring disagreements, so that discouraged dissenters drop out and an artificial consensus is generated underestimating the demanding nature of a Delphi and the fact that the respondents should be recognized as consultants and properly compensated for their time if the Delphi is not an integral part of their job function.

II. DELPHI: AN APPLICATION

"The Stow Project"

The Stow Project is a set of activities leading to the preparation of a report on community goals. It is based on two initial assumptions about citizen involvement: (1) that any community goals project should secure substantial citizen contributions from the very beginning of the activity, and (2) that, despite the preoccupation of the past decade with "citizen participation," technologies for organizing extensive, meaningful participation are still quite primitive. Thus the Stow Project began with emphasis on the selection of cognitive aids for citizen input.

A third assumtion was that citizens do not ordinarily think about their community in terms of goals. Even more rarely do they think in terms of sets of mutually consistent goals. Rather, they tend to be very specific about problems to be solved or remedial action to be taken. For this reason, the Stow Project adopted the view that the process of defining goals should be inductive, moving from very specific citizen concerns to the general policy statements that undergird specific wants or complaints. The cognitive aids used in the Project should therefore facilitate the inductive process.

The final assumption was that very few communities are so homogeneous that there is a complete consensus about the future. Goals held by different segments of the community may well be incompatible with one another, views of desirable futures may be diametrically opposed. Thus, the cognitive aids should be capable of preserving diversity, while at the same time sharpening the consensus that may also prevail.

The Project did not actually begin with Stow; it began with a commitment to a process based on the four assumptions described above. A search was made for a community where these ideas could be tested, and where several cognitive aids could be applied in an integrated fashion. Stow turned out to be the best available site.

The City of Stow is a suburb of Akron, Ohic, containing about 24,000 people. Lying in a corridor of rapid expansion,it grew from 6,280 in 1950 to 12,200 in 1960 and then to 19,800 in 1970. Stow contains some of the largest tracts of zoned industrial land in the region. At the same time, it has developed primarily as a community of single family dwelling units. Its inhabitants are college-educated and middle class. Many are employed as technical and managerial personnel in the large rubber companies of Akron.

Stow has long been concerned with adequate planning. It is one of only two suburban communities in the Akron area with a professional planning staff. Concerned with moving forward in such areas as land development policies, parks, street improvements, and capital programming, the mayor appointed a Citizens Advisory Group in March, 1977. The CAG was to serve as a bridge between the citizenry and city officials in developing city plans, programs, and priorities.

It was six months later that we established contact with the Stow planning director to offer our assistance in applying a set of cognitive aids to the CAG's task. The planning director was receptive and, through him, the mayor's support was secured. Thus began the Stow Project, which thus far has been designed around the integrated use of Nominal Group Technique, Delphi, Q factor analysis, and scenarios.

The following are the principal steps in the Project:

Step 1: Two nominal group sessions were conducted with the CAG. Half the membership responded to the NGT question "What are the major problems faced by the City of Stow?"

The other half dealt with the NGT question "What specific actions should local government take in order to benefit the present and future residents of the City of Stow?"

Purpose: To ilicit pertinent, realistic ideas with which to seed a Delphi instrument.

Results: 32 community problems and 36 courses of action.

Step 2: The first round of a Delphi (see Appendix A) was distributed to 179 residents of Stow. The respondents were nominated by the CAG, the City council and the City Planning Commission . The items in the Delphi were obtained from the NGT results of Step 1. The 68 problems and actions identified in the NGT sessions were combined into 34 suggestions of actions that Stow should take.

Purpose: To determine the extent to which residents agreed that these were things that Stow should do, and to ilicit other important suggestions not securred in the NGT sessions.

Results: The rating of 34 items on a four- position scale (strongly agree - agree,- disagree - strongly disagree), and the gathering of 53 new items suggested by the respondents. One hundred and twenty-nine questionnaires (72%) were returned.

Step 3: The second round of the Delphi (see Appendix B) was distributed to the 129 residents who answered the first round.

Purpose: (1) To secure judgments about the relative priority of (a) 28 items on which there was a high level of agreement in round one and (b) 32 new items obtained from round one.

(2) To secure judgments about the realtive priority of six items on which there was relatively little agreement in round one and to justify

the continued retention of these items.

Results: Rating of 66 items on a 5-point priority scale, and written comments on 6 of these items. Ninety-eight questionnaires (76%) were returned.

Step 4: Factor analysis* of the results of the Delphi first round.

Purpose: (1) To group the citizen respondents according to common attitudes.

(2) To utilize the attitude groupings as a bases for creating alternative scenarios for the City of Stow.

Results: Two factors — growth and self-sufficiency — that will be useful in the preparation of alternate growth scenarios.

Step 5: Round one results were discussed at a meeting of the CAG, particularly high - importance items that were ambiguous. CAG members were each requested to write brief scenarios dealing with (a) assumptions about population, the mix of housing types, and industrial and commercial development, and (b) desirable futures in four areas: education, parks and recreation, transportation,and government structure and processes.

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* Q Factor Analysis, which provides for the factoring of individuals, was utilized. Each of the thirty-four items in the survey was ranked according to a free distribution that ranged from +2 to -2 for each of the 112 responses. The SPSS (Blue) Factor Analysis program was used, yielding 16 low-grade factors. Due to this wide distribution, the next iteration was limited to 4 factors based on the preliminary loadings. To accomodate all 112 individuals, two factor analyses were run and 61 of the highest loaded individuals (30 from the first run, 31 from the second) were factored for a final time and the structure was refined through quartrimax rotation. Forty-four individuals loaded significantly (over .4 at the .01 level). Factor I contained 19 significant loadings, Factor II 6, Factor III 14, and Factor IV 5 significant loadings.

Purpose: To secure material useful in constructing scenarios.

Result: Clarification of ambiguous items in round one of the Delphi, and the gathering of scenarios written by CAG members.

Step 6: The third round of the Delphi (see Appendix C) was distributed to 129 residents.

Purpose: (1) To inform respondents about their vote patterns on round two.

(2) To seek clarification of ambiguous high priority items.

Results: Written clarification.

At this writing, step 6 is in progress. The next step will be the preparation of three or four scenarios of Stow's future. The major features of the scenarios will be anchored firmly to the results of Steps 4, 5 and 6. The scenarios will be discussed with the CAG. If they seem to be reasonable futures, lists of goals will be abstracted from them. After being divided into functional areas, the goals will be discussed with Stow resident in workshop settings. Finally, a consolidated goals report will be drafted for discussion with, and approval by, the CAG.

In summary, the Stow Project has been operated so as to integrate cognitive aids. An NGT was used to front-end a Delphi. Likewise, the Delphi front-ends the writing of scenarios. Both the Delphi and Q factor analysis have been applied in order to sharpen major differences of opinion among the citizens, which, in turn, will be reflected in the scenarios.

APPENDIX A

City of Stow

3760 Darrow Road • Stow, Ohio 44224 • Phone (216) 688-8206

October 12, 1977

Dear Fellow Citizen:

Six months ago I appointed a Citizens Advisory Group and a Professional Advisory Committee to work with our Planning Commission on setting goals for public services in Stow. As part of this process, we are now seeking the views of a large number of citizens. This questionnaire is the first round in a series of consultations with members of the community. You have been suggested as someone who is knowledgeable about Stow. I urge you to respond, for we want the results to reflect the thinking of as many community interests as possible.

Thank you for your assistance.

Sincerely,

C. Paul Hutchison

C. Paul Hutchison
Mayor

CPH/mjm

PLEASE RETURN THIS QUESTIONNAIRE BY OCTOBER 21st IN THE ENCLOSED ENVELOPE AND NOTE THAT YOUR RESPONSE WILL BE RETURNED TO ONE OF THE TWO K.S.U. PROFESSORS CONDUCTING THE STUDY.

A number of suggestions have been offered about what should be done to benefit the present and future residents of Stow. We want your opinion as to whether you agree or disagree with the following suggestions. You can do that by checking the appropriate space to the right of each of the suggestions listed below. For example, if you believe that Stow should "attract more retail business," you would check the space under the column strongly agree or agree. On the other hand, if you do not think it is necessary for Stow to attract more retail business, check the column headed disagree or strongly disagree. We have left room at the end of the questionnaire for you to write your suggestions which are not included in the following list.

	STOW SHOULD . . .	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	Attract more retail businesses.	____	____	____	____
2.	Seek new industrial plants to be built.	____	____	____	____
3.	Enable more multi-family housing.	____	____	____	____
4.	Make provision for a limited amount of low-income housing.	____	____	____	____
5.	Attract more service businesses such as appliance repair, dry cleaners, etc.	____	____	____	____
6.	Annex adjacent township areas.	____	____	____	____
7.	Limit further industrial encroachment on residential areas.	____	____	____	____
8.	Study means of preserving historical sites and natural resources.	____	____	____	____
9.	Determine how much population growth can be accommodated without undue increase in the cost of services.	____	____	____	____
10.	Develop a program of city beautification.	____	____	____	____
11.	Sponsor an annual festival with many different types of activities, called a Stow Citizens Day.	____	____	____	____

(OVER)

STOW SHOULD . . .	Strongly Agree	Agree	Disagree	Strongly Disagree
12. Develop a civic center.				
13. Change the city charter to give more administrative power to the Mayor.				
14. Improve communications between city government and the citizens.				
15. Cooperate with surrounding cities and townships on mutual problems.				
16. Improve community support of the schools.				
17. Develop cooperative programs between the schools and city hall.				
18. Build an adequate high school physical plant.				
19. Reduce the overcrowding in the schools.				
20. Change the antiquated 9 month system of public education.				
21. Provide public transportation within Stow and to other cities like Akron and Kent.				
22. Complete the Route 8 expressway through Stow.				
23. Provide more arterial streets for through traffic.				
24. Expand street capacity by improvements in traffic control.				
25. Build a community recreation center.				
26. Prepare a program for the orderly development of parks, particularly neighborhood parks.				
27. Provide more recreation programs for young people, especially teenagers.				
28. Upgrade the services of the police department.				

STOW SHOULD . . .	Strongly Agree	Agree	Disagree	Strongly Disagree
29. Upgrade the services of the fire department.	____	____	____	____
30. Provide para-medic services.	____	____	____	____
31. Improve street maintenance.	____	____	____	____
32. Install storm sewers throughout the city.	____	____	____	____
33. Improve trash pick-up.	____	____	____	____
34. Develop its own water supply.	____	____	____	____

Maybe the above suggestions do not cover those actions which you believe should be undertaken. We want your views! Please take a few moments to list them here:

_____

_____

_____

_____

_____

Would you please provide us with the following information. This process requires a series of questionnaires which will lead to an ultimate determination of community priorities. We need your name and address to give you the results of this round and to seek your further advice.

Name: _____

Street: _____

City, Zip: _____

Occupation: _____

Education: (please check)

____ less than high school
____ high school graduate
____ some college
____ college graduate

Circle your response:

Number of dependent children in your household:

1 2 3 4 5 or more

Years of residence in Stow:

0-3 4-15 more than 15

Age: under 30 30-40 40-50 50-60 over 60

APPENDIX B

KENT STATE UNIVERSITY
KENT, OHIO 44242

COMMUNICATION AND LAW PROJECT
CENTER FOR INTERDISCIPLINARY RESEARCH
(216) 672-2788/2252

27 October 1977

Dear Citizen:

Thank you for participating in the first round of a process which we hope will determine citizen goals for public services in Stow. The response was very good and we are writing to you again.

In the last questionnaire a number of you pointed out that it is easy to agree with many of the items on the original list but that the key is which of them are priority items; all of the activities can not be undertaken at the same time. Therefore, this time we are interested in determining which of the activities should have priority consideration. To the right of each of the items is a scale numbered 5, 4, 3, 2, 1. We want you to circle the number which you believe designates the priority of the item. Use the following key:

5= Critical or urgent activity; first order priority; must be undertaken immediately for the benefit of the city.

4= Second order priority; of considerable significance; requires attention as soon as possible.

3= Third order priority; has some importance; not a major activity; does not have to be undertaken now.

2= Fourth order priority; has little importance; does not have to be undertaken.

1= No priority; should be dropped as an item to consider.

We calculated for each item on the first round the percentage of respondents who checked the "strongly agree" and "agree" ratings. For your information, we have included these data in parentheses. Also, some respondents wrote additional suggestions about what might be done in Stow. These are new items you are seeing for the first time.

Please note that once again you will be returning the completed questionnaire in an enclosed envelope to us. Please do so by November 7, 1977.

Thank you for your continued cooperation.

Sincerley,

James G. Coke

James G. Coke

Carl M. Moore

Carl M. Moore

Circle the number which you believe designates the priority of the item.
Use the following key:

5= Critical or urgent activity; first order priority; must be undertaken immediately for the benefit of the city.

4= Second order priority; of considerable significance; requires attention as soon as possible.

3= Third order priority; has some importance; not a major activity; does not have to be undertaken now.

2= Fourth order priority; has little importance; does not have to be undertaken.

1= No priority; should be dropped as an item to consider.

STOW SHOULD . . .	Priority
Business and Industrial Development	
1. Attract more retail businesses. (72% agree)	5 4 3 2
2. Seek new industrial plants to be built (77% agree)	5 4 3 2
3. Attract more service businesses such as appliance repair, dry cleaners, etc. (67% agree)	5 4 3 2
4. Allow industrial expansion only in areas currently zoned for such development. (new item)	5 4 3 2
5. Allow Andrew Paton Airport to improve its present facilities. (new item)	5 4 3 2
6. Zone land surrounding Andrew Paton Airport for office-research and light industrial development. (new item)	5 4 3 2
7. Zone as commercial the land bordering routes 59 and 91. (new item)	5 4 3 2
8. Protect "downstream" businesses and residences from drainage problems due to development by "upstream" builders. (new item).	5 4 3 2
9. Develop a large shopping mall. (new item)	5 4 3 2

(over)

STOW SHOULD . . .	Priority
Residential Development	
1. Limit further industrial encroachment on residential areas (78% agree)	5 4 3 2 1
2. Restrict multi-family housing to areas currently zoned for such housing. (new item)	5 4 3 2 1
3. Scatter low-income housing, rather than concentrate it in one area. (new item)	5 4 3 2 1
4. Allow the development of low-income housing only for the elderly. (new item)	5 4 3 2 1
5. Prohibit all present R-1 single family areas from any further rezoning. (new item)	5 4 3 2 1
6. Enable more multi-family housing. (31% agree)	5 4 3 2 1
7. Make provision for a limited amount of low-income housing. (47% agree)	5 4 3 2 1
Civic Development	
1. Study means of preserving historical sites and natural resources (99% agree)	5 4 3 2 1
2. Develop a program of city beautification. (93% agree)	5 4 3 2 1
3. Sponsor an annual festival with many different types of activities, called a Stow Citizens Day. (74% agree)	5 4 3 2 1
4. Develop a civic center. (72% agree)	5 4 3 2 1
5. Develop a combined civic and recreation community center. . (new item)	5 4 3 2 1
6. Encourage the formation of citizen interest groups. (new item)	5 4 3 2 1
7. Upgrade the library. (new item)	5 4 3 2 1
8. Publish a newsletter to communicate city programs. (new item)	5 4 3 2 1
9. Build a community theatre. (new item)	5 4 3 2 1
10. Preserve green areas perpetually. (new item)	5 4 3 2 1

(go to next page)

STOW SHOULD . . .	Priority
Schools	
1. Improve community support of the schools. (94% agree)	5 4 3 2 1
2. Develop cooperative programs between the schools and city hall. (92% agree)	5 4 3 2 1
3. Build an adequate high school physical plant. (84% agree)	5 4 3 2 1
4. Reduce the overcrowding in the schools. (93% agree)	5 4 3 2 1
5. Locate the high school more centrally. (new item)	5 4 3 2 1
6. Change the 9 month system of public education. (53% agree)	5 4 3 2 1
Transportation	
1. Provide public transportation within Stow and to other cities like Akron and Kent. (72% agree)	5 4 3 2 1
2. Complete the Route 8 expressway through Stow. (87% agree)	5 4 3 2 1
3. Provide more arterial streets for through traffic. (71% agree)	5 4 3 2 1
4. Expand street capacity by improvements in traffic control. (88% agree)	5 4 3 2 1
5. Improve traffic safety. (new item)	5 4 3 2 1
Services	
1. Determine how much population growth can be accomodated without undue increase in the cost of services. (90% agree)	5 4 3 2 1
2. Upgrade the services of the police department. (82% agree)	5 4 3 2 1
3. Upgrade the services of the fire department. (85% agree)	5 4 3 2 1
4. Provide para-medic services (89% agree)	5 4 3 2 1
5. Improve street maintenance. (98% agree)	5 4 3 2 1
6. Install storm sewers throughout the city (73% agree)	5 4 3 2 1
7. Develop its own water supply. (77% agree)	5 4 3 2 1
8. Improve street lighting. (new item)	5 4 3 2 1
9. Enforce sidewalk snow removal. (new item)	5 4 3 2 1

(over)

STOW SHOULD . . .	Priority
Services continued	
10. Retain trash pick-up by private firms. (new item)	5 4 3 2 1
11. Improve trash pick-up. (63% agree)	5 4 3 2 1
12. Improve leaf pick-up. (new item)	5 4 3 2 1
13. Provide services such as mowing weeds and treating dust. (new item)	5 4 3 2 1
14. Enforce leash laws. (new item)	5 4 3 2 1
Parks and Recreation	
1. Build a community recreation center (80% agree)	5 4 3 2 1
2. Prepare a program for the orderly development of parks, particularly neighborhood parks. (90% agree)	5 4 3 2 1
3. Provide more recreation programs for young people, especially teenagers. (92% agree)	5 4 3 2 1
4. Upgrade Silver Springs Park. (new item)	5 4 3 2 1
5. Add better recreational facilities to the parks. (new item)	5 4 3 2 1
6. Improve the YMCA. (new item)	5 4 3 2 1
Government	
1. Improve communications between city government and the citizens. (100% agree)	5 4 3 2 1
2. Investigate the possibility of increased state and federal grants. (new item)	5 4 3 2 1
3. Adopt the city manager form of government. (new item)	5 4 3 2 1
4. Bring more professionals into the city administration. (new item)	5 4 3 2 1
5. Reduce the administrative power of city council. (new item)	5 4 3 2 1
6. Better publicize the work of city hall (Council meetings, committee meetings, etc.)	5 4 3 2 1
7. Change the city charter to give more administrative power to the mayor. (33% agree)	5 4 3 2 1

(go to next page)

STOW SHOULD . . . Priority

Intergovernmental Cooperation

1. Cooperate with surrounding cities and townships on mutual problems. (94% agree) 5 4 3 2 1

2. Annex adjacent township areas. (54% agree) 5 4 3 2 1

More than 1/3 of the respondents disagreed with the items listed below. If you believe we should retain any of the following items on our list of activities which Stow should undertake, please provide your reasons next to the item. If you do not write anything by an item, we assume you are telling us that the item should be left off the list.

STOW SHOULD. . .

1. Enable more multi-family housing. (31% agree) _____

2. Make provision for a limited amount of low-income housing. (47% agree) _____

3. Change the 9 month system of public education. (53% agree) _____

4. Improve trash pick-up. (63% agree) _____

5. Change the city charter to give more administrative power to the mayor (33% agree) _____

6. Annex adjacent township areas. (54% agree) _____

APPENDIX C

KENT STATE UNIVERSITY
KENT, OHIO 44242

COMMUNICATION AND LAW PROJECT
CENTER FOR INTERDISCIPLINARY RESEARCH
(216) 672-2788 2232

November 21, 1977

Dear Citizen:

Thank you for participating in the first and the second round of this process which is determining goals for public services in Stow. The response continues to be excellent and we are writing to you again, possibly for the last time.

It is now necessary for us to ask you to give more detail on some of those items which were ranked very high (they are a priority of 4 or 5) but need to be clarified. You do not have to write about each of the items. You might choose to comment only on those items which are meaningful to you or about which you have some specific suggestions. Additional comments may be made on the reverse side.

We realize that we have asked you for a great deal of your time. The payoff is that you and your fellow citizens will have extensive input into shaping Stow's future.

Sincerely,

James G. Coke

James G. Coke

Carl M. Moore

Carl M. Moore

PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENCLOSED ENVELOPE TO US BY DECEMBER 1, 1977.

Kent State University Supports Equal Opportunity

On the last questionnaire, you ranked 66 items according to their priority, giving scores ranging from 1 (should be dropped) to 5 (critical or urgent). There were nineteen items that received an average score of 4.0 or above. Such scores mean that most of you gave each of them a score of 4 or 5. They are obviously items of great significance for Stow.

We have divided these items into two groups. The first is a group of nine whose meaning is unambiguous. We list them here for your information.

1. Allow industrial expansion only in areas currently zoned for such development.

2. Limit further industrial encroachment on residential areas.

3. Complete the Route 8 expressway through Stow.

4. Restrict multi-family housing to areas currently zoned for such housing.

5. Protect "downstream" businesses and residences from drainage problems due to development by "upstream" builders.

6. Determine how much population growth can be accommodated without undue increase in the cost of services.

7. Investigate the possibility of increased state and federal grants.

8. Reduce the overcrowding in the schools.

9. Prepare a program for the orderly development of parks, particularly neighborhood parks.

The second group of high priority items, however, raises questions about meaning. We now ask your assistance in giving additional detail. In the list below, we make some brief comments and ask questions. Please use the space provided to write your views. You need not comment on all the questions, but the more you provide, the more we will be able to clarify the issues facing Stow.

1. SEEK NEW INDUSTRIAL PLANTS TO BE BUILT.

   Comment: Stow has a large amount of vacant land along Hudson Drive that is zoned for industrial use. Do you have any preference for the types of industry that should be attracted to that location? What types would you not like to see in Stow? What plant size is desirable or does size make any difference? Please write your comments in the spaces below.

2. IMPROVE COMMUNITY SUPPORT OF THE SCHOOLS.

Comment: The voters just passed a school levy. Is this evidence that support is increasing?

What more should be done to improve community support?

3. DEVELOP COOPERATIVE PROGRAMS BETWEEN THE SCHOOLS AND CITY HALL.

Comment: This is an ideal that is often expressed, but seldom accomplished. In Stow's present situation, what joint programs should be implemented?

4. IMPROVE COMMUNICATIONS BETWEEN CITY GOVERNMENT AND THE CITIZENS.

Comment: In what areas are communications bad?

What can city government do to improve communications? (Please be as specific as possible.)

Can citizens' groups play a constructive role in improving communications? If so, how?

5. BETTER PUBLICIZE THE WORK OF CITY HALL (COUNCIL MEETINGS, COMMITTEE MEETINGS, ETC.).

Comment: This seems related to the item just discussed. How can city hall activities be more effectively publicized?

6. COOPERATE WITH SURROUNDING CITIES AND TOWNSHIPS ON MUTUAL PROBLEMS.

Comment: What problems does Stow have in common with nearby communities?

What should Stow city government do to foster the needed cooperation?

7. IMPROVE STREET MAINTENANCE.

Comment: Where is street maintenance poor? Are these problems concentrated in any specific sections of Stow, or do they exist everywhere?

8. UPGRADE THE LIBRARY.

Comment: Is this a problem of physical facilities or services? Both?

How, specifically, should the library be upgraded?

9. STUDY MEANS OF PRESERVING HISTORICAL SITES AND NATURAL RESOURCES.

Comment: What historic sites or natural resources are important to preserve in Stow?

10. PROVIDE MORE RECREATION PROGRAMS FOR YOUNG PEOPLE, ESPECIALLY TEENAGERS.

Comment: What, in your opinion, are the types of recreation programs that would be most appropriate for Stow?

III. DELPHI: SOME LESSONS

Our collective experience with the Delphi technique has led us to certain conclusions.

1. It is important to establish the credibility of those conducting the Delphi as well as the process itself. This is especially true when the respondents are not experts. In the Stow project we were able to do this by conducting the study under the auspices of city government (particularly the mayor's office), by making the respondents stakeholders in the process, by pointing to the reasons for their selection as participants, and by beginning with an instrument (Round 1) which revealed that we were knowledgeable about their community.

2. Nominal Group Technique (NGT) is a very useful technique for front-ending the Delphi. We were able to appear knowledgable in Round 1 of Stow because we conducted an NGT session with the Stow Citizens Advisory Group (CAG) to build the cognitive map of city needs/problems.

3. While maintaining the integrity of respondent input, items should be as concrete as possible. For example, in Round 1 of the Stow project we phrased an item "Make provision for a limited amount of low-income housing" rather than simply say what was recommended, "Build more low income housing." The city does not build housing and the concept of "limited" has turned out to be key in understanding this item.

4. Quick turn-around time reduces respondent attrition. In less than eight weeks we designed, administered, and analyzed the three rounds of the Stow project.

5. Each Delphi instrument should ask the respondents to perform focused tasks, and preferably one task. It is better to have an additional round than to complicate an instrument.

6. It is best to begin with relatively simple instruments, asking for information which is easy for the respondent to provide (such as filling out scales). One can escalate the complexity of the instruments once the respondents are committed to the process. In the case of the Stow project our instruments progressively became more subjective and less quantitative.

7. It is best to allow the results from each round to dictate the nature of the following round. We have not found it useful to prescribe the nature of all of the rounds when beginning a Delphi. In the Stow project we tentatively decided after Round 1 that Round 2 would get at priorities and Round 3 would focus on finances. However, it turned out that it was more important for Round 3 to gain a clearer understanding of certain items.

8. A monitoring team, rather than a single individual, should analyze results and design ensuing rounds.

9. Delphi is not an end in itself and Delphi products might not be wholly satisfactory in their final form; often they must be interpreted or used as input into another process for achieving the group's goals. Stow is a good example of how Delphi can be used in conjunction with other processes.